Lead Poisoning, Behavior Problems and Violence

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Childhood lead poisoning impacts communities.

Lead poisoning is one of several powerful biological and environmental factors that affect delinquency and adult crime and violence. Other factors include behavioral disorders during youth, low school achievement, hyperactivity, and low levels of parental education.
(Denno DW. 1990. Biology and Violence. New York: Cambridge University Press)

Lead poisoning in children and youth has been linked to:

- **Delinquency**
- **Hyperactivity**
- **Aggression**
- **Parent- and teacher- reported behavior problems**
- **Antisocial, criminal and violent behaviors**

Findings	Citation
A prospective study of 250 individuals 19-24 years of age demonstrates an association between developmental exposure to lead and adult criminal behavior. Blood lead levels were measured during pregnancy and until the children were 6.5 years old. Prenatal and postnatal blood lead concentrations are associated with higher rates of **total arrests and arrests for offenses involving violence**. For every 5 µg/dL increase in blood lead level at six years of age, the risk of being arrested for a violent crime as a young adult increases by 50%.	Wright JP, Dietrich KN, Ris MD, Hornug RW, Wessel SD, Lanphear BP, Ho M, Rae MN. Association of prenatal and childhood blood lead concentrations with criminal arrests in early adulthood. PLoS Medicine Vol. 5, No. 5, e101 doi:10.1371/journal.pmed.0050101 (2008).
Preschool blood lead levels were associated with subsequent **crime rate trends** over several decades in the USA, Britain, Canada, France, Australia, Finland, Italy, West Germany and New Zealand.	Nevin R. Understanding international crime trends: the legacy of preschool lead exposure. Environ Res. 2007 Jul; 104(3):315-36.
Elevated lead levels were associated with **delinquency**. In a case-control study of 194 adjudicated youth compared to 146 nondelinquent controls from Pittsburgh high schools, adjudicated delinquents were 4 times more likely to have elevated bone lead levels than controls. Study considered race, parent education and occupations, single-parent households, number of children in home and neighborhood crime rate.	Needleman H, McFarland C, Ness R, Fienberg S, Tobin M. Bone lead levels in adjudicated delinquents: A case control study. Neurotoxicology and Teratology. 2002; 24: 711-717.
In a birth cohort of 195 urban, inner-city adolescents recruited between 1979 and 1985, prenatal exposure to lead was associated with increase in the frequency of parent-reported and self-reported **delinquent and antisocial behaviors**.	Dietrich KN, Ris MD, Succop PA, Berger OG, Bornschein RL. Early exposure to lead and juvenile delinquency. Neurotoxicol Teratology. 2001 Nov-Dec; 23 (6): 511-8.
201 African-American children aged 2 through 5 years were studied. In comparison with the low exposed group, the high exposed group (two consecutive blood lead levels >= 15 mg/dl) showed a higher measure of parent-reported **behavioral problems**.	Sciarillo GW, Alexander G, Farrell KP. Lead exposure and child behavior. Am J Public Health. 1992 Oct; 82(10):1356-60.
The behavior of 501 school children aged 6-9 years in the United Kingdom were rated by parents and teachers. A dose-response relationship was seen between increased blood lead levels and increased (worse) **aggressive/anti-social and hyperactive behavior** ratings.	Thomson GO, Raab GM, Hepburn WS, Hunter R, Fulton M, Laxen DP. J Child Psychol Psychiatry. 1989 Jul; 30(4):515-28.